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INTERNATIONAL PRELIMINARY EXAMINATION REPORT
(PCT Article 36 and Rule 70)

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Rec'd PCT/PTO 23 JUN 2005

Applicant's or agent's file reference SJC/P01987WO		FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/PEA/416)	
International application No. PCT/GB 03/05525	International filing date (day/month/year) 18.12.2003	Priority date (day/month/year) 24.12.2002	
International Patent Classification (IPC) or both national classification and IPC F26B11/02			
Applicant OPHNEIL, Henry Perry			
<p>1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of 5 sheets, including this cover sheet.</p> <p><input checked="" type="checkbox"/> This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).</p> <p>These annexes consist of a total of 4 sheets.</p>			
<p>3. This report contains indications relating to the following items:</p> <p>I <input checked="" type="checkbox"/> Basis of the opinion</p> <p>II <input type="checkbox"/> Priority</p> <p>III <input type="checkbox"/> Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</p> <p>IV <input type="checkbox"/> Lack of unity of invention</p> <p>V <input checked="" type="checkbox"/> Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</p> <p>VI <input type="checkbox"/> Certain documents cited</p> <p>VII <input type="checkbox"/> Certain defects in the international application</p> <p>VIII <input type="checkbox"/> Certain observations on the international application</p>			
Date of submission of the demand 26.07.2004		Date of completion of this report 18.04.2005	
Name and mailing address of the International preliminary examining authority:  European Patent Office - P.B. 5818 Patentlaan 2 NL-2280 HV Rijswijk - Pays Bas Tel. +31 70 340 - 2040 Tx: 31 651 epo nl Fax: +31 70 340 - 3016		Authorized Officer Silvis, H Telephone No. +31 70 340-3021 	

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No.: PCT/GB 03/05525

1. Basis of the report

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

Description, Pages

1-3, 6-15 as originally filed
4, 5 received on 17.02.2005 with letter of 17.02.2005

Claims, Numbers

1-11 received on 17.02.2005 with letter of 17.02.2005

Drawings, Sheets

1/6-6/6 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
☐ the language of publication of the international application (under Rule 48.3(b)).
☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
☐ filed together with the international application in computer readable form.
☐ furnished subsequently to this Authority in written form.
☐ furnished subsequently to this Authority in computer readable form.
☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
☐ the claims, Nos.:
☐ the drawings, sheets:

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. **PCT/GB 03/05525**

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)).
(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	1-11
	No: Claims	
Inventive step (IS)	Yes: Claims	1-11
	No: Claims	
Industrial applicability (IA)	Yes: Claims	1-11
	No: Claims	

2. Citations and explanations
see separate sheet

Re Item V

Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

Reference is made to the following document:

WO 01/98092 A (PERRY OPHNEIL HENRY ;ALCHALABI RIFAT (US)) 27 December 2001 (2001-12-27)

1 NOVELTY AND INVENTIVE STEP

1.1 The document WO 01/98092 A is regarded as being the closest prior art to the subject-matter of claim 1, and shows (the references in parentheses applying to this document):

an oven (10), comprising:

- a charging portion (12) for receiving material (11) to be treated;
- a rotatable changeover portion (14) **comprising a treatment chamber (16) heated by a flow of hot gases;**

the oven (10) being moveable between a first position in which the changeover portion (14) is generally higher than the charging portion (12) and a second position in which the charging position (12) is generally higher than the changeover portion (14).

1.2 The subject-matter of claim 1 differs from this known oven in that:

- the changeover portion comprises an outer chamber and that the treatment chamber is an inner chamber within the outer chamber;
- means to heat the inner treatment chamber externally thereof **by the flow of hot gases;** and
- the inner treatment chamber being adapted to receive material from the charging portion as the oven moves from the first position to the second position.

1.3 The subject-matter of claim 1 is therefore new (Article 33(2) PCT).

1.4 The problem to be solved by the present invention may be regarded as: how to

reduce the likelihood of the material to be treated, when in the form of powder or small shredded pieces, to become entrained in the flow of hot gases passing through the heat treatment chamber.

- 1.5 The solution to this problem proposed in claim 1 of the present application is considered as involving an inventive step (Article 33(3) PCT) for the following reasons:

the combination of an oven known from the prior art and the feature of an outer chamber and an externally heated inner treatment chamber within the outer chamber is neither known from, nor rendered obvious by, the available prior art.

- 1.6 Claims 2-11 are dependent on claim 1 and as such also meet the requirements of the PCT with respect to novelty and inventive step.

2 FURTHER REMARKS

- 2.1 It appears from the description (see page 1, line 3-6; page 4, line 18-25) that the following feature is essential to the definition of the invention:
a rotatable changeover portion ***comprising a treatment chamber heated by a flow of hot gases.***
Therefore, this feature should have been included in independent claim 1. (Article 6 PCT taken in combination with Rule 6.3(b) PCT).
- 2.2 Independent claim 1 is not in the two-part form in accordance with Rule 6.3(b) PCT, which in the present case would be appropriate, with those features known in combination from the prior art (document WO 01/98092 A) being placed in the preamble (Rule 6.3(b)(i) PCT) and with the remaining features being included in the characterising part (Rule 6.3(b)(ii) PCT).
- 2.3 The features of the claims are not provided with reference signs placed in parentheses (Rule 6.2(b) PCT).

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receiving material to be treated and a changeover portion. Incorporated within the changeover portion is a heat treatment chamber through which a stream or flow of hot gases can be passed. The oven is pivotally moveable between a first position in which the changeover portion is higher than the charging portion and a second position in which the charging portion is higher than the changeover portion. The arrangement is such that the oven can be repeatedly moved between the first and second positions so that material within the oven falls from one portion to the other portion, passing through the stream of hot gases in the heat treatment chamber. A method of using the apparatus is also disclosed.

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The above known oven has the advantage that it can be used to treat comparatively low volumes of material in a batch process. A further advantage is that by controlling the movement of the oven, the material being treated can be brought into and out of the heat treatment chamber at will, enabling the oven to be operated safely without the process going autothermic in an uncontrolled manner and allowing a very fine degree of control of the treatment process.

The oven described in WO 01/98092 A1 has been found to work well, providing a commercially and technically acceptable means of thermally de-coating relatively low volumes of materials. However, when treating light weight materials, such as powders or materials that have been shredded into very small pieces, there can be a tendency for some of the material being treated to become entrained in the flow of hot gases passing through the heat treatment chamber. Whilst some of the entrained material can be filtered out of the gas flow and recollected, there is an overall reduction in the efficiency of the process.

It is an object of the present invention is to provide an improved oven in which the problems of the known oven are overcome or at least reduced.

- 10 In accordance with the invention, there is provided an oven comprising:
- a charging portion for receiving material to be treated;
 - a rotatable changeover portion comprising an outer chamber and an inner treatment

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chamber within the outer chamber;
and means to heat the inner treatment chamber externally thereof;
the oven being moveable between a first position in which the changeover portion is
generally higher than the charging portion and a second position in which the
charging portion is generally higher than the changeover portion;
the inner treatment chamber being adapted to receive material from the charging
portion as the oven moves from the first position to the second position.

It is an advantage of an oven in accordance with the invention, that the material treated in
the inner treatment chamber can be heated indirectly by virtue of the external heating of
the inner treatment chamber. A further advantage of an oven in accordance with the
invention is that the walls of the inner treatment chamber are heated by the external
heating means. When the material being treated enters the inner treatment chamber, some
will come into contact with the hot walls, helping to heat the material and so reducing
processing times.

In a preferred embodiment, the external heating means comprises a flow of hot gases
through the outer treatment chamber and which passes over at least part of the external
surface of the inner treatment chamber.

It is a particular advantage of the invention that the material being treated is separated
from the flow of gases through the outer chamber by the inner treatment chamber. As a
result, the material does not become entrained in the flow of gases through the outer
chamber.

In a particularly preferred embodiment the oven further comprises an inlet means for

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Claims

1. An oven comprising;
5 a charging portion for receiving material to be treated;
a rotatable changeover portion comprising an outer chamber and an inner treatment chamber within the outer chamber;
and means to heat the inner treatment chamber externally thereof;
the oven being moveable between a first position in which the changeover
10 portion is generally higher than the charging portion and a second position in which the charging portion is generally higher than the changeover portion;
the inner treatment chamber being adapted to receive material from the charging portion as the oven moves from the first position to the second position.
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2. An oven as claimed in claim 1 in which means are provided for introducing a flow of hot gases through the outer treatment chamber so that, in use, the
20 gases flow around at least part of the external surfaces of the inner treatment chamber to heat the inner treatment chamber externally.
3. An oven as claimed in claim 1 or claim 2 further comprising means for introducing a flow of hot gases through the inner treatment chamber.
4. An oven as claimed in claim 3, in which the means for introducing a flow of
25 hot gases comprises an array of inlet nozzles.
5. An oven as claimed in claim 4, in which the array of nozzles are located adjacent a first side wall of the inner treatment chamber.
- 30 6. An oven as claimed in claim 5, in which the means for introducing a flow of hot gases through the inner treatment chamber further comprises an outlet vent through which the gases can exit the inner treatment chamber.

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7. An oven as claimed in claim 6, in which the outlet vent is located in a second side wall of the inner treatment chamber opposite from the first wall.
- 5 8. An oven as claimed in claim 5 or claim 6, in which the outlet vent is positioned such that, in use, as the oven moves between the first and second positions, the material passing between the charging box and the inner treatment chamber does not fall through the outlet vent.
- 10 9. An oven as claimed in any previous claim, in which the oven is rotated in a first direction as it moves from the first position to the second position and is rotated in the opposite direction as it moves from the second position to the first position.
- 15 10. An oven as claimed in any one of claims 3 to 9, when dependent on claim 2, in which the oven further comprises a control means for regulating the flow and/or the oxygen content of gases passing through the outer treatment chamber.
- 20 11. An oven as claimed in claim 10 when dependent on claim 3, in which the control means is also adapted to regulate the flow and/or oxygen level of the gases flowing through the inner treatment chamber independently of the gases flowing through the outer treatment chamber.

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